Docket No. RDID 02002US

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: SCHAFFAR, Berhard

Application No.: 10/031,516 Group No.: To Be Assigned

Filed: Jan. 16, 2002 Examiner: To Be Assigned

For: CREATININE BIOSENSOR

Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir or Madam:

Please enter the following amendments prior to examination of the above-referenced application:

IN THE CLAIMS:

Please cancel claims 1 to 9, without prejudice, in the originally filed application.

Please enter new claims 10 to 22, clean copies of which are shown on the attached pages as required by 37 C.F.R. 1.121. Because the previous claims have been canceled, no marked up copies of the previous claims are enclosed herein.

The new claims place the claims in the format preferred by the U.S. patent and Trademark Office. For example, multiple dependent claims have been replaced by singly dependent claims. The amendments to the claims are fully supported by the specification as originally filed. No new matter has been added.

Claims:

10. A method for producing biosensors comprising at least two enzymes for the amperometric determination of enzymatically degradable substances in biological liquids wherein the enzymes are immobilized on a working electrode, comprising applying an

enzyme together with one or more surface-active substances in an aqueous solution on the working electrode, allowing said enzyme together with the one or more surface-active substances in the aqueous solution to dry, and chemically immobilizing the at least second enzyme thereupon.

11. The method according to claim 10, wherein polyalcohols, detergents, or a combination thereof are used as surface-active substances.

12. The method according to claim 11, wherein non-ionic tensides are used as surface-active substances.

13. The method according to claim 11, further comprising applying a cover membrane after immobilization.

14. The method according to claim 10, wherein the at least second enzyme is immobilized by crosslinking, covalent binding or matrix inclusion.

15. The method according to claim 14, wherein the at least second enzyme is immobilized by glutardialdehyde.

16. The method according to claim 14, further comprising applying a cover membrane after immobilization.

17. The method according to claim 11, wherein the at least second enzyme is immobilized by crosslinking, covalent binding or matrix inclusion.

18. The method according to claim 17, further comprising applying a cover membrane after immobilization.

19. A biosensor comprising a working, a reference and a counter electrode, produced by means of the method according to claim 10, wherein the reference electrode is an Ag/AgCl electrode and the counter electrode is a carbon electrode and the working electrode consists of carbon, metal, metal oxides or a mixture of carbon and metal or metal oxides, the electrodes being applied on a nonconducting substrate.

20. A biosensor according to claim 19 for the determination of creatinine, wherein sarcosine oxidase is adsorbed on the working electrode and creatininase and creatinase are immobilized thereupon.

21. A biosensor according to claim 20, wherein it is made up of two three-electrodes systems, the first electrode system comprising the enzymes creatininase, creatinase and sarcosine oxidase and serving for the determination of the sum of creatinine and creatine and the second electrode system comprising the enzymes creatinase and sarcosine oxidase and serving for the determination of creatine, whereby the two results are subtracted for the determination of creatinine.

22. A biosensor according to claim 21 which comprises a further electrode system serving for the elimination of electrochemical interferences.

Respectfully submitted,

Date: July 29, 2002

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CLEAN COPY OF THE CLAIMS

10. A method for producing biosensors comprising at least two enzymes for the amperometric determination of enzymatically degradable substances in biological liquids wherein the enzymes are immobilized on a working electrode, comprising applying an enzyme together with one or more surface-active substances in an aqueous solution on the working electrode, allowing said enzyme together with the one or more surface-active substances in the aqueous solution to dry, and chemically immobilizing the at least second enzyme thereupon.

11. The method according to claim 10, wherein polyalcohols, detergents, or a combination thereof are used as surface-active substances.

12. The method according to claim 11, wherein non-ionic tensides are used as surface-active substances.

13. The method according to claim 11, further comprising applying a cover membrane after immobilization.

14. The method according to claim 10, wherein the at least second enzyme is immobilized by crosslinking, covalent binding or matrix inclusion.

15. The method according to claim 14, wherein the at least second enzyme is immobilized by glutardialdehyde.

16. The method according to claim 14, further comprising applying a cover membrane after immobilization.

17. The method according to claim 11, wherein the at least second enzyme is immobilized by crosslinking, covalent binding or matrix inclusion.

18. The method according to claim 17, further comprising applying a cover membrane after immobilization.

19. A biosensor comprising a working, a reference and a counter electrode, produced by means of the method according to claim 10, wherein the reference electrode is an Ag/AgCl electrode and the counter electrode is a carbon electrode and the working electrode consists of carbon, metal, metal oxides or a mixture of carbon and metal or metal oxides, the electrodes being applied on a nonconducting substrate.

20. A biosensor according to claim 19 for the determination of creatinine, wherein sarcosine

oxidase is adsorbed on the working electrode and creatininase and creatinase are immobilized thereupon.

21. A biosensor according to claim 20, wherein it is made up of two three-electrodes systems, the first electrode system comprising the enzymes creatininase, creatinase and sarcosine oxidase and serving for the determination of the sum of creatinine and creatine and the second electrode system comprising the enzymes creatinase and sarcosine oxidase and serving for the determination of creatine, whereby the two results are subtracted for the determination of creatinine.

22. A biosensor according to claim 21 which comprises a further electrode system serving for the elimination of electrochemical interferences.